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ABSTRACT

Presented in this guide are learning activities and related materials to assist teachers in preparing seventh-grade students for a visit to a nature study center. Activities are suggested for individuals, small and large groups, and are classified according to whether the activity is to be completed before the visit, during the visit, or as a follow-up activity. A pre- and post-test and a list of expected standards of conduct and safety for students are included. The publication is designed for a specific site, but could be adapted to other sites. (BT)

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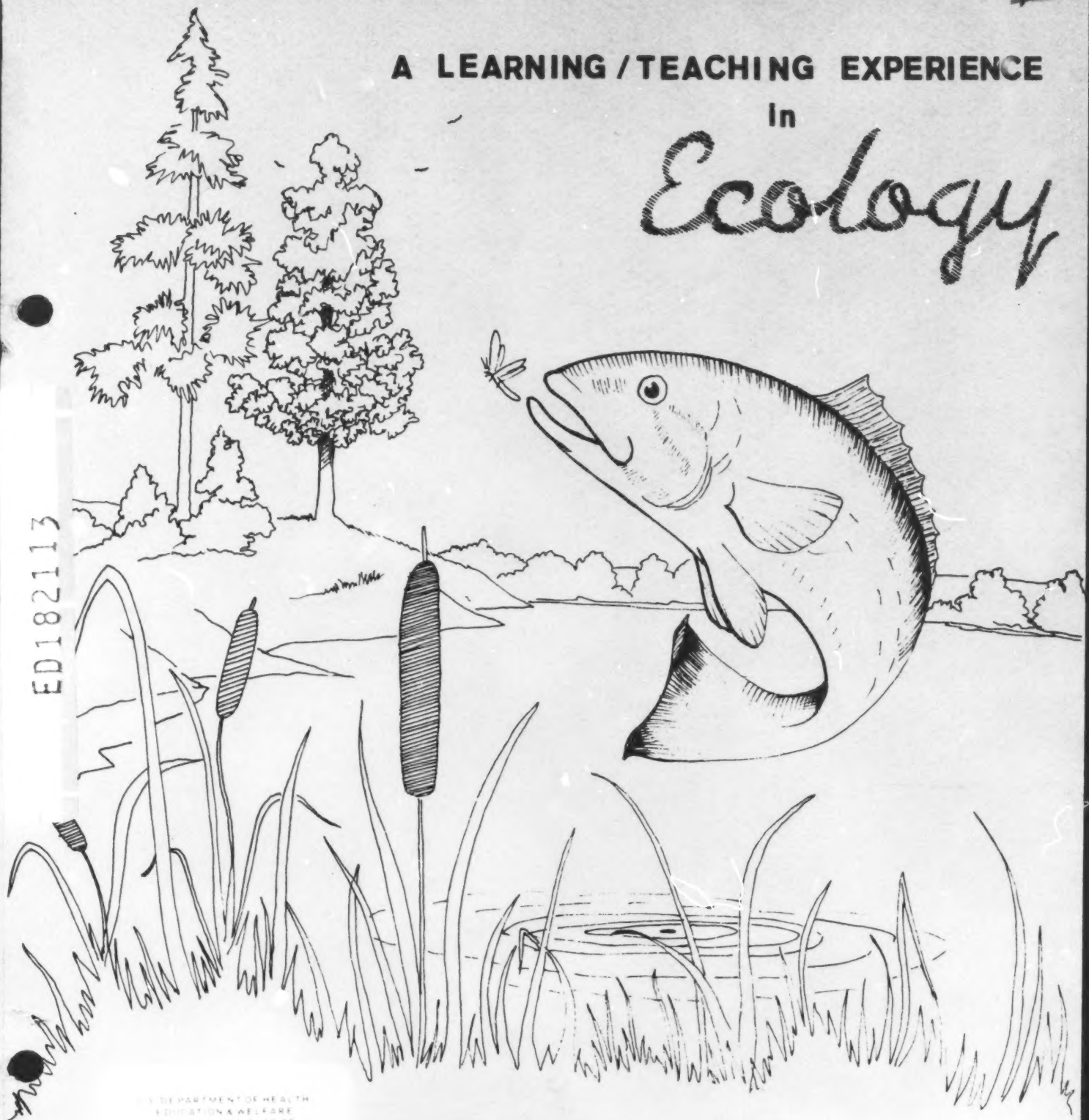
A LEARNING / TEACHING EXPERIENCE

in

Ecology



ED182113

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

for seventh year students at the

BOSSIER PARISH NATURE STUDY CENTER

John McConathy

SE 029 527

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Preface

The purpose of this booklet is to help teachers to better motivate students and to reinforce the concepts encountered in environmental education.

The Bossier Parish Nature Study Center provides a place for exploration, observation and participation. Environmental Education is designed to improve the quality of life by making students aware of the world around them and by motivating them to work toward making this a better place in which to live.

Objectives

To recognize the great variety of populations

To acquaint students with the roles of producers, consumers, and decomposers

To emphasize interdependency among all populations in the ecosystem

To develop a feeling of responsibility toward preservation and conservation of the ecosystem

Procedure

The following pages offer suggested activities to help your study of populations, ecosystems, and pollution. Activities have been suggested for small groups, individuals, and large groups. Some activities will be done before going to the Bossier Parish Nature Study Center and others are more appropriate for participation at the Center and for follow-up upon your return to the school.

Before touring the Center, students should have taken the pretest and studied chapters two and three in Life Science, McGraw Hill, Inc.

Shortly before your planned visit to the Center, prepare your students by giving them specific assignments. A list of special small group (five students per group) activities has been provided. If you decide not to group your class, there are suggestions listed for activities every student could do. Individual assignments are also included.

Activities and Materials to Reinforce Text Study

1. Pretest
2. Books, Pamphlets, and Transparencies
3. Activity 1
4. Activity 2
5. Activity 3
6. Activity 4
7. Activity 5
8. Activity 6
9. Activity 7

PRETEST

Teacher note: This test will be given before Chapter 2, Life Science, McGraw Hill, Inc. is begun. The students will not have access to the corrected papers. Choose the one best answer for each question.

1. A nature study center is a/an

   a. ecosystem
   b. community
   c. biosphere
   d. ecosphere

2. One food chain is

   a. fresh water shrimp – pond alga – perch
   b. Oak tree – insect larvae – red bird
   c. algae – bass – minnow
   d. grasshopper – green plant – praying mantis

3. Decomposers are necessary in the forest because they

   a. make food
   b. give carbon dioxide back to the air
   c. eat 2nd order consumers
   d. eat 2nd order producers

4. In the forest you will find this producer:

   a. squirrel
   b. hickory tree
   c. bracket fungi
   d. woodpecker

5. In the forest you will find this decomposer:

   a. Virginia Creeper
   b. spider
   c. mushroom
   d. opossum

6. The most important contribution that trees make to man is

   a. furnishing buidling materials
   b. giving homes to animals that he eats
   c. providing compost
   d. giving oxygen to the atmosphere

7. When a large tree dies and is removed from an area, all of the following except one can take place. Name the one that will not take place.

   a. sun loving plants will appear
   b. the soil may be poorer without leaves to decay
   c. shade loving plants will disappear
   d. decomposers in the area die

8. It is important that we protect our environment for all these reasons except one. Name that one.

   a. Animals and plants may become extinct.
   b. Future generations will need organisms.
   c. We are a part of many food webs.
   d. Most food chains do not affect man.

9. The populations in a nature study center would be:

a. few
b. many
c. sparse
d. tough

10. Which living organism would you expect to find in the lake at the nature study center?

a. lichen
b. a starfish
c. a coral snake
d. a small crustacean

11. "All living things depend on each other." Which one of the following supports this statement?

a. All consumers eat producers.
b. Decomposers live on consumers only.
c. Secondary consumers would live if all producers disappeared.
d. Living things are involved in complicated food webs.

12. All of the following except one are kinds of pollution that could spoil a natural area. Name that exception.

a. air
b. chlorophyll
c. water
d. thermal

13. The eagle that eats the mouse that was eating the wild oats is an example of

a. a 2nd order consumer
b. a decomposer
c. a 1st order producer
d. a 3rd order consumer

14. In the forest you will find this consumer:

a. bacterium
b. sassafras tree
c. poison ivy
d. land turtle

15. These are usually the most visible in an ecosystem:

a. producers
b. decomposers
c. consumers
d. "top dogs"

16. One part of the physical environment is made up of

a. air
b. trees
c. birds
d. bacteria

17. A biological community is defined best as

a. a group of animals linked in a food chain.
b. a group of populations supported by a food pyramid.
c. a group of populations that live in a certain area.
d. a group of living things that belong to the same web.

18. The forest organism that may be detected by having a strong odor is

a. a consumer
b. a decomposer
c. a producer
d. a pigment

KEY TO TEST

1. a
2. b
3. b
4. b
5. c
6. d
7. d
8. d
9. b
10. d
11. d
12. b
13. a
14. d
15. a
16. a
17. c
18. b

Books, Pamphlets, and Transparencies

A Field Guide to the Birds. Houghton Mifflin Co. One copy is in the Nature Study Center and one is in each school Resource Center.

Pond Life. Field Books, Bolden Nature Series. Twelve copies are being placed in the Center and one in each school's Resource Center.

Commercial Trees of Louisiana. Louisiana Forestry Commission. Twelve copies are being placed in the center and one in the school's Resource Center.

Transparencies:
Biology, Ecological Aspects, 3M Company, Catalog 270, transparency numbers 24A, 24B, 24C, 24D. A copy of the four transparencies has been placed in your school's Resource Center.

ACTIVITY I

TASK: To recognize relationships between organisms and their environment.

MATERIALS:

one list of animals
one list of plants
one list of non-living elements

PROCEDURE:

1. From the list provided by the teacher, select two plants and two animals and write each in one block of the plant or animal group column below.

2. From the list provided by the teacher, select one non-living element needed by each plant and animal you listed in the first column. Place each non-living element opposite the plant or animal which needs the element.

3. In the third column, write the relationships between each plant or animal and group and non-living element.

PLANT OR ANIMAL GROUP	NON-LIVING ELEMENT	RELATIONSHIP
EXAMPLE: corn	sunlight	corn needs sunlight to carry on photosynthesis

Activity 2

TASK: To study the relationships of various organisms to their environment.

MATERIALS: Blunt probe or instrument

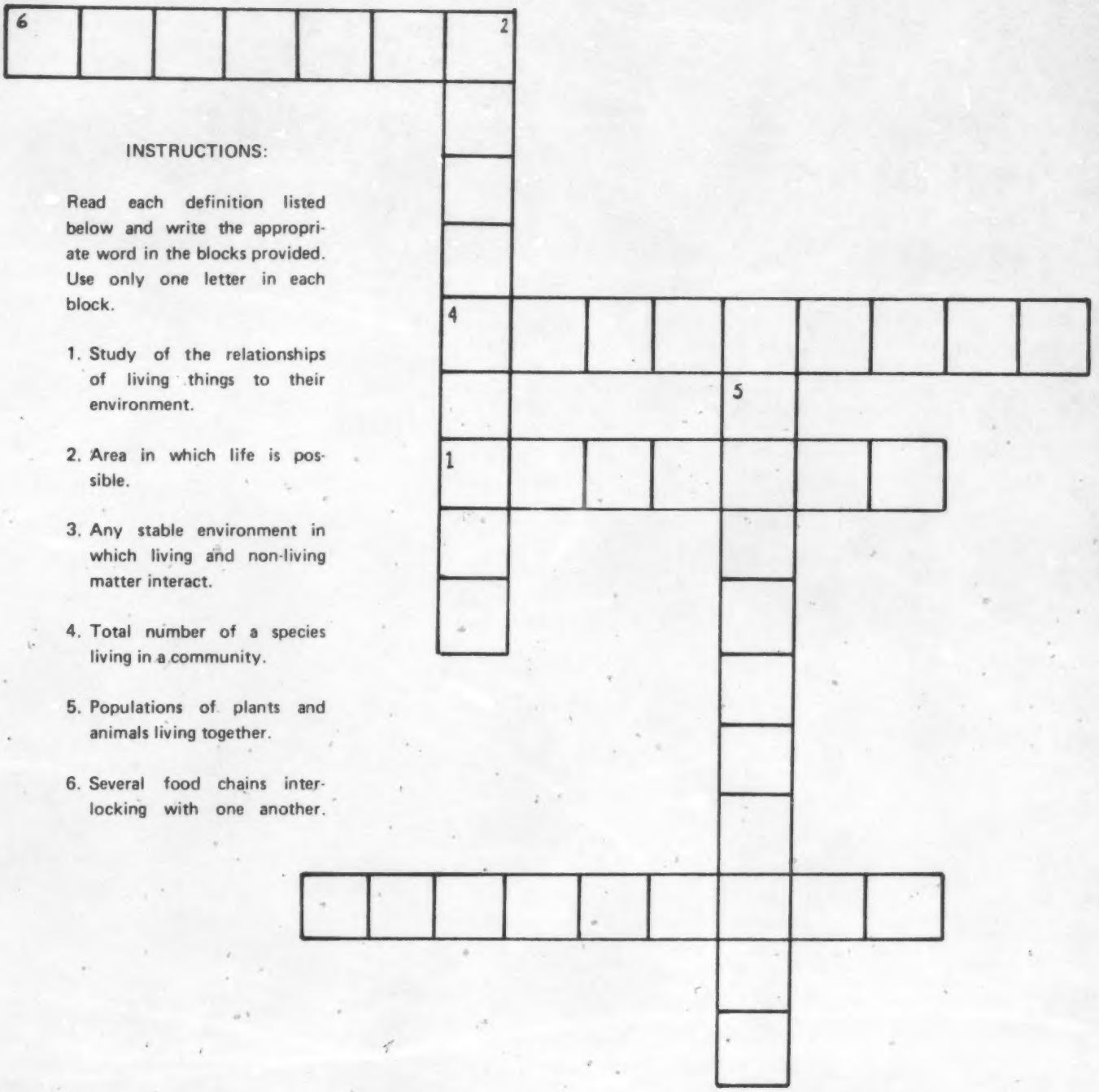
PROCEDURE:

1. Go to the study area assigned by the teacher.
2. Look for different plants and animals in the study area and record the names of the organisms in the results section.
3. Write the different areas where you saw the plants and animals in the results section.
4. Write the non-living elements found in the study area in the proper sections of the results section.
5. Write the relationships or possible relationships between the non-living elements and the organism in your study area in the results section.

RESULTS:

AREA WHERE ORGANISMS WERE FOUND	ORGANISMS (PLANT OR ANIMAL)	NON-LIVING ELEMENT	RELATIONSHIPS BETWEEN ORGANISMS AND NON-LIVING ELEMENTS

ACTIVITY 3



INSTRUCTIONS:

Read each definition listed below and write the appropriate word in the blocks provided. Use only one letter in each block.

1. Study of the relationships of living things to their environment.
2. Area in which life is possible.
3. Any stable environment in which living and non-living matter interact.
4. Total number of a species living in a community.
5. Populations of plants and animals living together.
6. Several food chains interlocking with one another.

ACTIVITY 3
(Key)

ECO – PUZZLE KEY:

```
FOODWEB
      I
      O
      S
      POPULATION
      H     C
      ECOLOGY
      R     M
      E     M
            U
            N
            I
ECOSYSTEM
            Y
```

ACTIVITY 4

TASK: Design at least three food chains

PROCEDURE:

1. From the following list of food chain components, select three producers, three consumers and three decomposers and construct three different food chains.

LIST OF FOOD CHAIN COMPONENTS:

apple	grass	cow	termites	cat
lettuce	tree	man	bear	tiger
corn	deer	carrot	fungi	crawfish
bread	rabbit	berries	rat	plankton
milk	coyote	mold	mushroom	fish

2. Write the term producer, consumer and decomposer above the proper food chain components in each of your food chains.

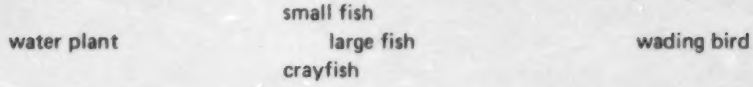
3. Food chains:

ACTIVITY 5

TASK: Construct a food web from food chains

PROCEDURE:

1. Study the following example of a food web.



2. Construct a food web from the food chains listed below.

   Grass - - - Deer - - Wolf

   Grass - - - Mouse - - - Hawk - - - Wolf

   Grass - - - Insect - - - Spider - - - Song Bird - - - Hawk - - - Bacteria

   Grass - - - Rabbit - - - Hawk - - - Wolf

3. Food Web (place the role that each organism plays in the food web above each organism: producer, consumer or decomposer.)

ACTIVITY 6

TASK: To construct a hypothetical food chain

PROCEDURE:

1. Select one producer organism from the following list of producer organisms.

2. Using this producer organism, make up a food chain (include the producer, consumer and decomposer).

PRODUCER ORGANISMS

wheat	grass	carrot
lettuce	weeds	berries
orange tree	shrub	plankton
apple tree	water lily	rice

3. Food Chain:

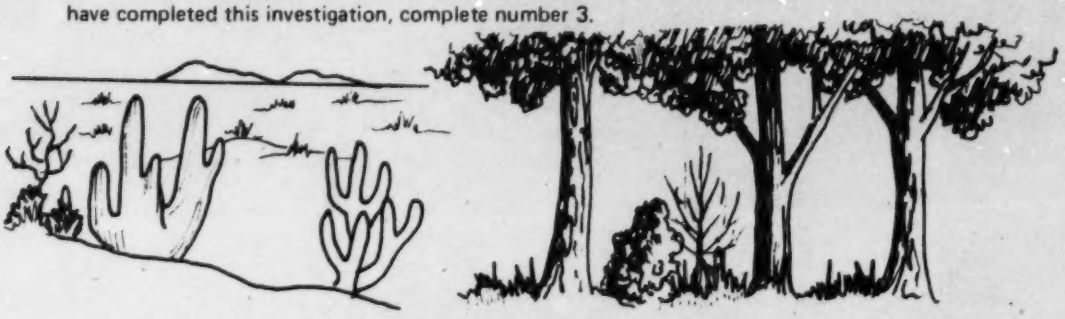
ACTIVITY 7

TASK: Identify different types of biotic communities

PROCEDURE:

1. Define the word Community. _____

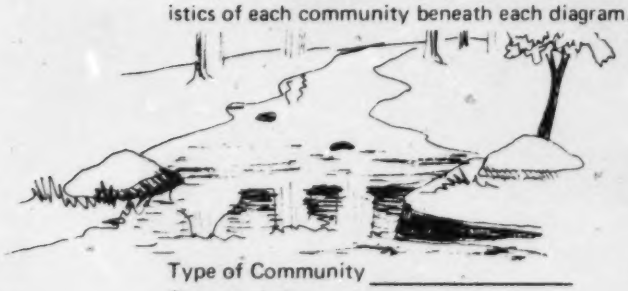
2. Study the two communities diagrammed below. Write characteristics of each community beneath each diagram. Example: soil, tree, grass, etc. After you have completed this investigation, complete number 3.



Type of Community _____
Characteristics _____

Type of Community _____
Characteristics _____

3. Study the two communities diagrammed below. Write the type and characteristics of each community beneath each diagram.



Type of Community _____
Characteristics _____

Type of Community _____
Characteristics _____

Expected Standards of Conduct and Safety on the Trip

1. Children will stay on the marked trail.

2. Children are to make no collections without permission from the Center Director.

3. Children should wear confortable walking shoes with socks and preferably long pants.

4. It is advisable to spray the children with insect repellent.

5. The teacher should acquaint the children with poison ivy, poison oak.

6. Children are not to pick up lizards, snakes or spiders.

Preparation Before the Tour

1. Instruct on how to use a microscope

2. Create small groups (five per group)

3. Give small group assignments

4. Instruct large group – give special assignments

5. Gather material needed (test tubes, corks to fit, notebook, pencil)

Small Group Activities

1. Fallen logs

   a. Find fallen logs.

      Sketch the logs.

      Examine logs.

      List/draw organisms found under and around the logs.

   b. Be prepared to explain how the organisms represent producer, consumer, and decomposer niches. (Possible answer: plants are the producers, animals are the consumers, and fungi, such as mushrooms, are the decomposers that decay the logs and return the minerals to the soil and the carbon dioxide to the air for re-use).

2. Water Community

   a. Collect samples of lake water.

   b. Take to Center's laboratory for microscopic examination. (12 are available)

   c. Make sketches of living organisms as they appear under the microscope.

   d. Share findings with entire group later at school.

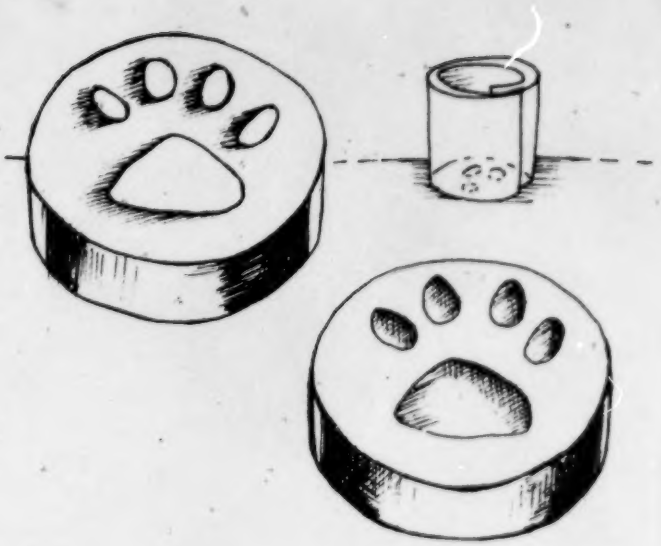
   e. Prepare to explain how these microorganisms help balance this water community by emphasizing food chains.

3. Preserving Animal Tracks

Materials you'll need: cardboard, plaster of Paris, pan, spoon, petroleum jelly.

Take a hike to the woods with a sack of plaster of Paris, pan, water, spoon, and cardboard cylinders. When a footprint of some animal is discovered on the ground, place the circle of cardboard around it. Mix some water in the plaster of Paris to the thickness of thin pudding. Pour this mixture over the animal track and let the plaster harden. Remove the cardboard, clean the soil off the surface, and grease the raised print with grease or petroleum jelly. This is the negative print.

Place another circle of cardboard around this mold so it extends a little above the level of the negative print. Pour another mixture of plaster of Paris on top of the first mold. When this hardens, separate the two pieces. The second casting is a positive print – depression – of the animal's footprint. (Not applicable if it rains.)



4. Native Plants

a. Find five plants native to Louisiana.

Draw a leaf, flower, stem or bark of each plant.

Gather a leaf from each plant. (With permission of Center's director)

b. Note where each plant was found. (Along lake, dense forest, very sunny area, etc.)

5. Habitats

a. Find 6 special habitats. (Three plant and three animal – hole, burrow, trail, moss on tree, fungi on log, etc.)

b. Prepare to tell what living organism's habitat you found and how it depends on its environment. (Example small pond – saw bream and moss – bream hides in moss – eats insects living in the moss, uses oxygen provided in water).

6. Plant and Animal Evidences

Arrange a string 3 meters long in a circular shape over an area containing several kinds of plants.

1. Record plant names on paper or draw your plants on a diagram of the circle.

2. Carefully shake the plants and record all animals on or leaving your area.

3. Tell any evidences that you find of food chains.

4. Name the producers, consumers and decomposers suggested by findings in your circle.

**** 7. Measuring A Tree

An activity involving measurement is to see which trees have the largest canopy of foliage area. Students can walk around a tree directly under the outmost limits of the farthest branches. The diameter can be measured with a yardstick, and the area figured by the formula $A = \pi r^2$. The height can also be measured with assistance from the Center's director.

8. Animal Sighting and Evidence

Choose an area at the edge of the woods. Look for the following things and record them:

1. What animals would you expect to find living in this area?

2. Explore the habitat. Record animals that you see or any evidences of animals. As you write these, figure out a way of recording amounts of evidences and animals seen.

3. Look for and list evidences (signs of animals – partly eaten foods, homes, bird nests, tracks).

4. Observe and list additional different habitats for wildlife in the area. (bottom land hardwood and pin oak flats)

5. Observe and list animal foods found in the area.

Activities for Large Group

1. Textures

   a. Make rubbings by selecting a variety of bark of leaves.

      Place paper over object to be rubbed.

      Move chalk, charcoal, or crayola back and forth until an image is formed.

   b. Write down the name of the tree from which each rubbing was made. A tree identification book will be provided.

2. Texture

   a. Compose a "touch" list. This is a word list that describes how things feel.

   b. With a list in hand students find objects in the environment that these words describe.

rough	thorny	scaley
smooth	soft	round and pointed
fuzzy	fluffy	bumpy
gummy	hard	

3. Pond Activity

   Students will seine organisms from the lake under the director's supervision. All students will have an opportunity to observe the organisms before they are placed back into the water. Two students will take water samples from the lake. These samples will be taken back to the nature center where twelve students may place a few drops of water under a microscope. All students will have an opportunity to view one of these samples.

4. Investigation – Activity 8

5. Natural Setting Worksheets

Activity 8

INVESTIGATION

TYPE OF COMMUNITY	ANIMALS VIEWED	PLANTS VIEWED	NON-LIVING THINGS
1. Forest			
2. Trail			
3. Pond			

Note: Write names of animals that you are certain are present although they are not seen on this date. Draw a star beside them to indicate that they were not seen today.

In classroom after trip:
Think about the following questions to discuss in the classroom after returning to school.
1. In which of the basic niches should each living thing be placed?
2. How does each organism interrelate with the non-living things?
3. What food web did you see?

Activity 9

NATURAL SETTING

WORK SHEET

In this activity you are asked to select one spot along the trail which you find expecially interesting and to spend enough time there to become very well acquainted with it. After exploring and getting a "feel" for your site, you will be asked to record your discoveries and impressions on the attached sheets.

Before you choose your site, or write anything on your worksheets, briefly walk the length of the trail, taking only enough time to get a general idea of what it contains. Once you have walked around the entire trail, think about the spot on the trail which you like the most.

Perhaps a fern bed, or a sunlit forest floor will be your choice. Maybe a tall red oak tree or an old, twisted myrtle bush will become your favorite. You may prefer the trail itself. The choice of a site is yours. Be thinking about the site selection as you make your first, brief, "survey" walk.

Now that you have found a suitable location, the next step is to find out what it has to offer. Before you write anything, take about ten minutes to really observe your site. Try very hard to use all your different senses. What sounds come to your ears? What particular odors do you detect? (Don't forget your senses to touch and sight.) What shapes and textures do you find? If you were to come here again, blindfolded, would you know the place?

The activities which now follow are for two purposes. The first set of questions is to help you see for yourself how well you observe, and also, to let you write down your feelings about your site. The second part is a list of suggestions for creating something original out of your visit. Hopefully, your creation will be something you can share with others - - - - a way of giving your experience to someone who wasn't actually there.

Activity 9 (Continued)

NATURAL SETTING

WORKSHEET

1. Briefly describe your site _____

_____

2. What are the five most noticeable things about your site? (Could be odors, sights, sounds, etc.)

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

3. Other than the trail itself, what evidence is there of man's presence?

_____

_____

4. Within your site, find and briefly describe examples of:

   a. old age _____

   b. perfect form _____

   c. distorted form _____

   d. man-altered form _____

   e. movement _____

   f. straight lines _____

   g. death _____

   h. life _____

5. How could people benefit from this site? _____

_____

6. In what ways would you change this site if you could? _____

_____

7. What is your reaction to being here at this site? _____

_____

_____

6. Plant and Animal Evidences

Arrange a string 3 meters long in a circular shape over an area containing several kinds of plants.

1. Record plant names on paper or draw your plants on a diagram of the circle.

2. Carefully examine the area and record all animals on or leaving your area.

3. Tell any evidences of food chains that you find.

4. Name the producers, consumers, and decomposers suggested by findings in your circle.

7. Museum Activity

Students will observe director or teacher feeding a bream, lizard, or a snake with a living organism.

Have a student explain how this is satisfying a link in a food chain. Ask one student to explain how this is an example of biological control of pests rather than having to use pesticides.

8. Preserving Animal Tracts

Materials you'll need: cardboard, plaster of Paris, pan, spoon, petroleum jelly.

Take a hike to the woods with a sack of plaster of Paris, pan, water, spoon, and carboard cylinders. When a footprint of some animal is discovered on the ground place the circle of cardboard around it. Mix some water in the plaster of Paris to the thickness of thin pudding. Pour this mixture over the animal track and let the plaster harden. Remove the cardboard, clean the soil off the surface, and grease the raised print with petroleum jelly. This is the negative print.

Place another circle of cardboard around this mold so it extends a little above the level of the negative print. Pour another mixture of plaster of Paris on top of the first mold. When this hardens, separate the two pieces. The second casting is a positive print – depression – of the animal's footprint. (Not applicable after rain)

Individual Activities

1. Nature's Sounds

   a. Take a tape recorder to an area away from others. Record all sounds in that area.

      Try to identify sounds.

   b. Share with class either back at the Center's main building or at school.

2. Bird Watcher (for one or two with binoculars) A bird reference book is available at the Center.

   Select an area away from the group.

   Note the habitat of the area.

   Watch for different kinds of birds or one kind.

   Name as many as possible.

   Share findings with group.

Follow-Up Activities

1. Complete Activity 8 chart

2. Reports by leaders of small groups

3. General discussion by class:

   a. general statements about what each saw

   b. specifically lead group into how organisms have special niches in ecosystem

   c. emphasize importance of producers, consumers and decomposers

   d. use the word "interdependent" while leading group to understand how populations depend on each other

   e. ask class to suggest how pollution spoils water communities, forest communities and ground communities. (Some concepts – unsafe water, destruction of habitats such as trees, or erosion or caused by pollution.)

*** 4. Make anti-pollution posters

5. Investigate pond water collected during tour.

6. Post Test

*** 7. Draw up a land use ordinance. This will be a nature trail "Bill of Rights" giving rules on the use and protection of our resources. Guidelines on collecting specimens, rules on littering, and conservation are things to include.

* 8. Write creative stories based on experiences at the Center.

* Correlates with Langauge Arts

** Correlates with Art

*** Correlates with Social Studies

**** Correlates with Math

Post Test

Choose the one best answer for questions 1 – 18. Questions 19 and 20 are discussion questions.

1. A nature study center is a/an

   a. ecosystem
   b. community
   c. biosphere
   d. ecosphere

2. One food chain is

   a. fresh water shrimp – pond alga – perch
   b. Oak tree – insect larvae – red bird
   c. algae – bass – minnow
   d. grasshopper – green plant – praying mantis

3. Decomposers are necessary in the forest because they

   a. make food
   b. give carbon dioxide back to the air
   c. eat 2nd order consumers
   d. eat 2nd order producers

4. In the forest you will find this producer:

   a. squirrel
   b. hickory tree
   c. bracket fungi
   d. woodpecker

5. In the forest you will find this decomposer:

   a. Virginia Creeper
   b. spider
   c. mushroom
   d. opossum

6. The most important contribution that trees make to man is

   a. furnishing buidling materials
   b. giving homes to animals that he eats
   c. providing compost
   d. giving oxygen to the atmosphere

7. When a large tree dies and is removed from an area, all of the following except one can take place. Name the one that will not take place.

   a. sun loving plants will appear
   b. the soil may be poorer without leaves to decay
   c. shade loving plants will disappear
   d. decomposers in the area die

8. It is important that we protect our environment for all these reasons except one. Name that one.

   a. Animals and plants may become extinct.
   b. Future generations will need organisms.
   c. We are a part of many food webs.
   d. Most food chains do not affect man.

9. The populations in a nature study center would be:

a. few
b. many
c. sparse
d. tough

10. Which living organism would you expect to find in the lake at the nature study center?

a. lichen
b. a starfish
c. a coral snake
d. a small crustacean

11. "All living things depend on each other." Which one of the following supports this statement?

a. All consumers eat producers.
b. Decomposers live on consumers only.
c. Secondary consumers would live if all producers disappeared.
d. Living things are involved in complicated food webs.

12. All of the following except one are kinds of pollution that could spoil a natural area. Name that exception.

a. air
b. chlorophyll
c. water
d. thermal

13. The eagle that eats the mouse that was eating the wild oats is an example of

a. a 2nd order consumer
b. a decomposer
c. a 1st order producer
d. a 3rd order consumer

14. In the forest you will find this consumer:

a. bacterium
b. sassafras tree
c. poison ivy
d. land turtle

15. These are usually the most visible in an ecosystem:

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b. decomposers
c. consumers
d. "top dogs"

16. One part of the physical environment is made up of

a. air
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17. A biological community is defined best as

a. a group of animals linked in a food chain.
b. a group of populations supported by a food pyramid.
c. a group of populations that live in a certain area.
d. a group of living things that belong to the same web.

18. The forest organism that may be detected by having a strong odor is

a. a consumer
b. a decomposer
c. a producer
d. a pigment

19. What did you like best about the Nature Center experience?

20. What do you think could have improved your experiences at the nature center?

KEY TO TEST

1. a
2. b
3. b
4. b
5. c
6. d
7. d
8. d
9. b
10. d
11. d
12. b
13. a
14. d
15. a
16. a
17. c
18. b
19. Answers will vary.
20. Answers will vary.